CLAIMS

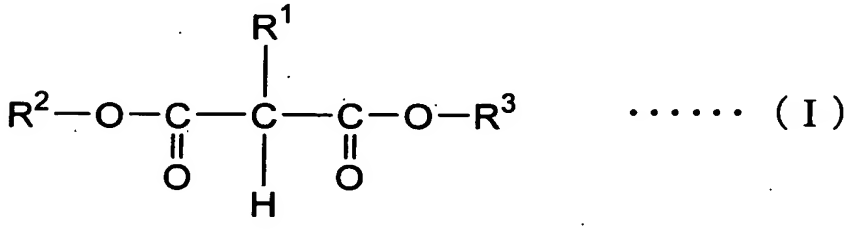
1. A solid catalyst component for olefin polymerization obtained by reacting the following compounds (i), (ii) and (iv); or (i), (ii), (iii) and (iv):

(i) a halogen-containing titanium compound;

(ii) an alkoxy-containing magnesium compound obtained by reacting metal magnesium, an alcohol and a halogen and/or a halogen-containing compound containing at least 0.0001 gram atom of halogen atoms per mol of the metal magnesium;

(iii) a halogen-containing silicon compound; and

(iv) an electron-donating compound represented by the following general formula (I):



..... (I)

wherein R^1 represents a linear or branched alkyl group having 1 or more carbon atoms; and R^2 and R^3 independently represent a linear or branched C_{1-20} alkyl group.

2. The solid catalyst component according to claim 1 wherein the halogen of the compound (ii) is iodine.

3. The solid catalyst component according to claim 1 wherein the halogen-containing compound of the compound (ii) is magnesium chloride.

4. The solid catalyst component according to claim 1

wherein the halogen-containing silicon compound (iii) is carbon tetrachloride.

5. The solid catalyst component according to claim 1 wherein the electron-donating compound (iv) is diethyl n-butylmalonate.

6. The solid catalyst component according to claim 1 wherein the halogen-containing titanium compound (i) and the alkoxy-containing magnesium compound (ii) are brought into contact with each other, and thereafter the electron-donating compound (iv) is brought into contact therewith when the compounds (i), (ii) and (iv) are reacted.

7. A catalyst for olefin polymerization comprising the following components [A] and [B]; or [A], [B] and [C]:

[A] the solid catalyst component according to claim 1;

[B] an organic aluminum compound; and

[C] an electron-donating compound.

8. A method of producing an olefin polymer which comprises polymerizing an olefin with the catalyst according to claim 7.

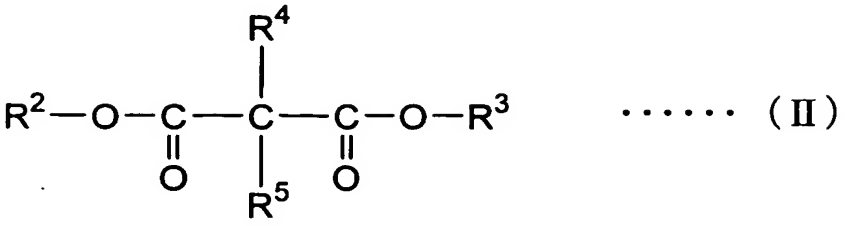
9. A solid catalyst component for propylene-ethylene copolymerization obtained by reacting the following compounds (a), (b) and (c); or (a), (b), (c) and (d):

(a) a magnesium compound;

(b) a titanium compound;

(c) an electron-donating compound represented by the

following general formula (II): and



$$\cdots\cdots (II)$$

wherein R^4 represents a linear, branched or cyclic C_{1-20} alkyl group; R^5 represents H or C_{1-2} alkyl group; R^4 and R^5 may be bound together to form a ring; and R^2 and R^3 independently represent a linear or branched C_{1-20} alkyl group;

(d) a silicon compound.

10. The solid catalyst component for propylene-ethylene copolymerization according to claim 9 wherein the solid catalyst component is a solid catalyst component obtained by bringing the compounds (a) and (c); or (a), (c) and (d) in contact with the compound (b) at 120 to 150°C, and thereafter washing the contact product with an inert solvent at 100 to 150°C.

11. The solid catalyst component for propylene-ethylene copolymerization according to claim 9 wherein the magnesium compound (a) is an alkoxy-containing magnesium compound obtained by reacting metal magnesium, an alcohol and a halogen and/or a halogen-containing compound containing at least 0.0001 gram atom of halogen atoms per mol of the metal magnesium.

12. The solid catalyst component for propylene-ethylene copolymerization according to claim 9 wherein R^4 represents

a linear, branched or cyclic C_{1-20} alkyl group; and R^5 represents H or C_{1-2} alkyl group.

13. The solid catalyst component for propylene-ethylene copolymerization according to claim 9 wherein the electron-donating compound (c) is diethyl n-butylmalonate.

14. The solid catalyst component for propylene-ethylene copolymerization according to claim 9 wherein the electron-donating compound (c) is dibutyl cyclobutane-1,1-dicarboxylate.

15. A catalyst for propylene-ethylene copolymerization comprising the following compounds [A] and [B]; or [A], [B] and [C]:

[A] the solid catalyst component according to claim 9;

[B] an organic aluminum compound; and

[C] an electron-donating compound.

16. The catalyst for propylene-ethylene copolymerization according to claim 15 wherein the catalyst is a preliminary polymerization catalyst obtained by bringing the components [A], [B] and [C] in contact with an α-olefin, an amount of preliminary-polymerization being from 0.1 to 100 wt%.

17. A method of producing a propylene-ethylene random copolymer which comprises random copolymerizing propylene and ethylene with the catalyst according to claim 16.

18. A propylene-ethylene random copolymer obtained by the

method according to claim 17.

19. The propylene-ethylene random copolymer according to claim 18 which has an ethylene content of from 0.1 wt% to 4 wt% and has a 0°C soluble component of 1.0 wt% or less.

20. The propylene-ethylene random copolymer according to claim 18 which has an ethylene content of more than 4 wt%, but 5 wt% or less; and has a 0°C soluble component of more than 1.0 wt%, but 2.0 wt% or less.

21. A method of producing a propylene-ethylene block copolymer which comprises the steps of:

polymerizing propylene to form a polypropylene component, and

copolymerizing ethylene and propylene to form an ethylene-propylene copolymer component,

wherein the catalyst according to claim 15 is used in at least one of the steps.

22. A propylene-ethylene block copolymer obtained by the method according to claim 21.

23. The propylene-ethylene block copolymer according to claim 22 whose MFR is from 10 to 20 g/10 minutes.